BG800-1 A
10/20/88

NUEXCO

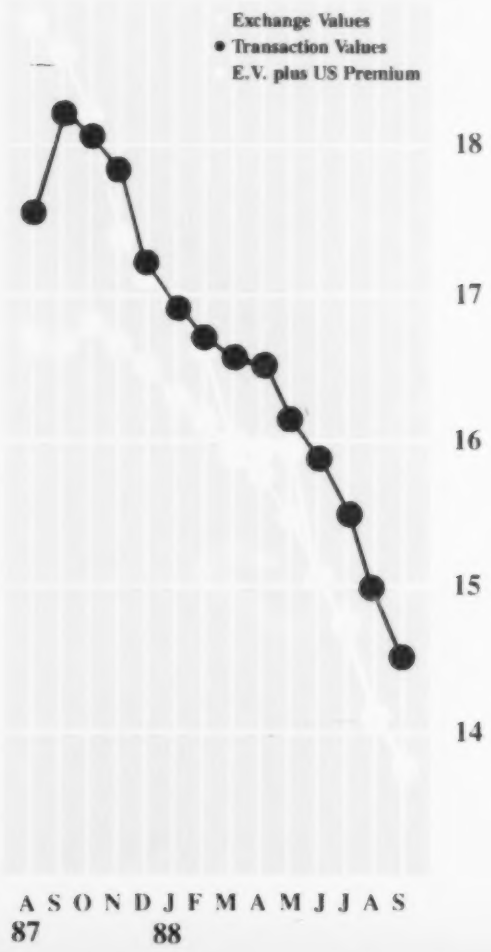
Monthly Report

October 1988 Number 242

Recent Developments in the FRG. 14

A Modest But Stable US Uranium Industry. 17

Canadian Uranium and the US Market 22



NUEXCO

NUEXCO INTERNATIONAL CORPORATION

CHAIRMAN - Oren L. Benton
CHIEF EXECUTIVE OFFICER - Charles H. Peterson

INTERNATIONAL HEADQUARTERS

Three Park Central, Suite 900 | 1515 Arapahoe Street | Denver, Colorado 80202 USA
Telephone: (303) 899-4500 | Telecopy: (303) 899-4555 | Telex: 450202 (NUEXCO DVR)

James E. Lewis	Financial Services	Denver
Fred Lawrence	Consulting Services	Denver
R. Wesley Miller	Analytical Services	Denver
Don A. Nichols	Acquisition/Merger Services	Denver
Bob Steele	Minerals Economic Services	Denver
Frederick J. Boyne	General Counsel	Denver

PRINCIPAL SUBSIDIARIES

NUEXCO TRADING CORPORATION

Earl E. Hoellen, Jr.	President	Denver
George White, Jr.	Vice President	San Francisco
James E. Vaughan	Vice President	Geneva
Walt H. Wolf	Commercial Director	Washington, D.C.
Robert J. Alexander	Commercial Representative	Denver
Clark M. Beyer	Commercial Representative	Denver
Donald W. Radcliffe	Commercial Representative	Denver
Kathryn K. Bowen	Commercial Representative	Geneva
James J. Lightner	Commercial Representative	Geneva
R. Lee Clanton, Jr.	Commercial Representative	Washington, D.C.
Kevin B. Jordan	Contract Controller	Denver

NUEXCO INFORMATION SERVICES COMPANY

R. Gene Clark	President	Denver
France A. Head	NUEXCO Monthly Report	Denver
Treva E. King	Director of Market Analysis	Denver
Carolyn B. McCants	Intl. Directory of Nuclear Utilities	Denver
Thomas C. Pool	Supply Analysis	Denver
David S. Schramm	Market Analysis	Denver
John M. Vallance	Demand Analysis	Denver
Anita E. Blumenthal	SWUCO Monthly Report	Washington, D.C

CONCORD NUEXCO INTERNATIONAL TRADE COMPANY

Wayne D. Fowler	President	Denver
Gerald L. Murdock	Senior Executive-Far East	Hong Kong
Donald P. Ebright	Senior Executive-Europe	Zurich
Christian C. Guitton	Commercial Representative	Tokyo

INTERNATIONAL ADVISORY COMMITTEE

J. Robert (Bob) Wolcott
Chairman (USA)

O.J.C. (John) Runnalls
(Canada)

Hans W. Vogt
(Switzerland)

T.J. (Tom) Barendregt
(The Netherlands)

George J. Stathakis
(USA)

Chris I. von Christierson
(South Africa)

Lars Halle
(Sweden)

James C.C. Stewart
(U.K.)

W. Bryan Webster
(USA)

© NUEXCO 1988

NUEXCO

MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

October 1988 No. 242

R. GENE CLARK, *EDITOR* FRANCE A. HEAD, *ASSOCIATE EDITOR*

PRICING
Nuexco Market Values Table 1
Natural Uranium and Conversion 2
Enriched Uranium and SWU 3

CURRENT MARKET DATA
Nuexco Market Values Expressed in Selected Currencies 5
Recent Transactions 7
Supply and Demand Tables 9

RECENT DEVELOPMENTS
Federal Republic of Germany 14
Finland 15
Republic of South Africa. 16

ANALYSIS AND COMMENTARY
A Modest but Stable US Uranium Industry 17
Canadian Uranium and the US Market 22

HISTORICAL MARKET DATA
Graph of Exchange Value and Transaction Value 27
Historical Exchange Values and Transaction Values 28
Historical Conversion Values and UF_6 Values 29
Volume and Price of Uranium Deliveries to the European Community . . . 30
US Uranium Marketing Activities Statistics 31
Graph of World Uranium Production 32

GOVERNMENT STATISTICS
Australia 33
Canada 34
South Africa 35
United States 36

NOTICE

This Report is prepared especially for Subscribers and is furnished to them for their use only. Except for internal use by Subscribers, no part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Nuexco. Neither this Report, nor copies of any portion thereof, may be lent, sold or given to non-Subscribers.

The information in this Report was gathered from sources Nuexco believes to be accurate. However, Nuexco makes no warranty, express or implied, and assumes no legal liability or responsibility for the accuracy, completeness or usefulness of any information contained herein. © 1988 Nuexco Services Ltd. ISSN 0742-4582

© NUEXCO 1988

NUEXCO

To Our Readers

* * *

NOTE: NEW TELEPHONE NUMBER

Please make a note that as of September 30, NUEXCO's telephone and telecopier numbers have been changed. The new numbers are:

TELEPHONE: (303) 899-4500

TELECOPIER: (303) 899-4555

© NUEXCO 1988

MARKET VALUES SUMMARY

September 30, 1988	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE[1]	**$13.75**/lb U_3O_8	5,820[2]	974[2]
US Premium[7]	**- 0 -**		
UF_6 VALUE[2]	**$40.75**/kg U as UF_6	5,820[2]	974[2]
US Premium	**- 0 -**		
CONVERSION VALUE[3]	**$1.95**/lb U as UF_6	660	2,535
SWU VALUE[4]			
0.3 tails assay:	**$65**/SWU	890	80
LOAN RATE[5]	**3.5%**/annum	2,950	0

	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
TRANSACTION VALUE[6]	**14.50**	**2.7**	**17**	**3**

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.
[2]For either uranium concentrates or uranium hexafluoride.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.
5. The **Loan Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

7. The **US Premium** is Nuexco's judgment of the incremental price (relative to the Exchange Value or UF_6 Value, as applicable) at which transactions for significant quantities of natural uranium could be concluded as of the date indicated, if the buyer will accept only US-origin.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these Market Values.
3. In the determination of prices, Nuexco does not consider transportation charges other than those customarily provided by suppliers.
4. The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
5. For the SWU Value, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

© NUEXCO 1988

NUEXCO

PRICING

NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of September 30, 1988)

The market for U_3O_8 and UF_6 weakened again this month as a result of continued competition for sales opportunities, and trading volume for combined near and long-term transactions declined to 2.4 million pounds U_3O_8 equivalent. Six U_3O_8 transactions, two of which involved long-term deliveries, and two UF_6 transactions were concluded. One secondary conversion market transaction is reported this month, the terms of which were essentially concluded several months earlier. Three SWU transactions occurred, one involving a large quantity of SWU, and one EUP sale was finalized.

The **Exchange Value** dropped to **$13.75** per pound U_3O_8, a decrease of $0.40 from last month, as actual transaction prices declined progressively during the month. Four near-term U_3O_8 transactions involving a total of approximately 370,000 pounds are reported, and additional material remains available at the Exchange Value level, as several utilities received several competitive offers at or near that price level during the month.

Two transactions, involving approximately 1.7 million pounds, are reported for long-term delivery . At least one transaction covering a significant quantity of U_3O_8 for long-term delivery is near completion, and several utilities are expected the enter the market in the next few months for long-term offers.

The **US Premium for U_3O_8** remains at **zero**. The USA has now passed implementing legislation for the US/Canada Free Trade Agreement (FTA), and its fate now lies with Canada. On October 3, Prime Minister Brian Mulroney announced that general elections would take place November 21. The central campaign issue is expected to be the FTA, which has been stalled in the Canadian Senate by the opposition Liberal Party leadership. Although Mr. Mulroney's Progressive Conservative Party currently enjoys a lead over the Liberal and New Democrat parties in public opinion polls, the opposition parties have both promised to scuttle the FTA.

A Gallup Poll conducted the last week of September gave the Conservative Party the support of 40 percent of the decided Canadian public, compared to 31 percent for the New Democrats and 26 percent for the Liberals. If this support persists through the election, the Conservatives are likely to retain their majority in the House of Commons. About a quarter of eligible voters are undecided, and a shift of only a few percentage points in support could leave the Conservatives with a minority of House of Commons seats. Such a minority would make it difficult, if not impossible, for Mr. Mulroney to obtain passage of the FTA's implementing legislation, in view of the stated opposition of the other parties.

It is expected to be a bitter campaign, with the opposition parties painting the FTA as a sellout of Canada's sovereignty. For example, Liberal Party leader John Turner accused Mulroney of signing over "the sovereignty and independence of our nation" through the FTA, which would "make us nothing more than a junior partner and, even, a colony of the United States". Mulroney's campaign strategy seems to be to play down the FTA, presenting it as part of a broader record of accomplishment in economic, social, and foreign policy for his Administration.

Potentially tied to the fate of the FTA is the attempt by the US uranium industry, through the US courts and Congress, to obtain enforcement of Section 161v of the US Atomic Energy Act, in order to restore the US uranium industry's viability by limiting imports. If the FTA is approved by Canada (now that the USA has approved it), the US Producers' Lawsuit against the DOE is probably moot, since the FTA exempts Canada from any restrictions on enriching imported uranium that might result from the lawsuit. On the other hand, if the FTA fails to win approval in Canada, the lawsuit may come to the forefront of US uranium producer efforts.

Although the US Supreme Court ruled against the producers on one narrow point of the lawsuit, the case is currently remanded back to the District Court for findings on whether the US uranium industry could be made viable through restrictions on DOE's enriching imported uranium for US end use. Judge Jim Carrigan of the District Court is scheduled to meet with attorneys for the producers and DOE on October 13 to set a trial date for this next phase of the lawsuit.

©NUEXCO 1988

Active supply of natural uranium (concentrates and UF_6) for spot delivery totals **5.3 million pounds** U_3O_8 equivalent, a decrease of approximately two million pounds since last month. **Active demand** for natural uranium also declined to approximately **1.0 million pounds**, compared to 1.6 million pounds the previous month. The **supply/demand ratio**, rounded up, is **6.0 to 1**.

* * *

The **Transaction Value** fell by $0.50 to **$14.50** per pound U_3O_8, as a result of the effect of recent lower-priced transactions in the calculation. Extending over a three month period, the calculation includes 17 transactions involving approximately 2.7 million pounds U_3O_8 equivalent.

* * *

The **UF_6 Value** decreased to **$40.75**, down $0.25 since last month. Two natural UF_6 transactions involving a total of less than 300,000 pounds U_3O_8 equivalent are reported. Active demand declined by 40 percent over the month, and a major UF_6 supplier has been less active in the market as a consequence of organizational changes. The degree to which this supplier actively participates in the spot market will significantly impact future UF_6 prices. Demand remains weak, although two utilities are expected to solicit offers for UF_6 at the beginning of the month. The **US Premium for UF_6** remains at **zero**.

* *

The **Loan Rate** is unchanged at **3.5 percent** per annum, and no loan transactions are reported.

The **Conversion Value** is unchanged at **$1.95** per pound U as UF_6, and one transaction which was essentially concluded several months ago is reported to fall in the 92-97 percent range of the current Conversion Value, consistent with the Conversion Value at that time. A sharply altered supply/demand ratio has increased the prospect of higher prices in the secondary market for conversion services. The availability of fewer deconversion swap transactions has reduced prospective supply, even as a number of utilities are entering the market to cover substantial near and longer-term unfilled requirements, some of which may be filled in the secondary conversion market.

* * *

ENRICHMENT SERVICES AND SWU

The **SWU Value** remains at **$65** per SWU. Four transactions took place, two of which involved quantities of less than 50,000 SWU each. One transaction involving enriched uranium product and another involving a large quantity of SWU were concluded at prices evaluated to be at or near the current SWU Value.

The SWU market has been fairly active over the last several months. One holder of excess DOE SWU was able to dispose of it at relatively competitive prices through a number of small sales over the spring and summer. In addition, larger sales opportunities caused supplies to emerge at very competitive prices, and was a factor in the recent SWU Value decline, from $73 in early 1988 to $65 at present. These supplies are expected to remain in the market, although no significant demand is likely to appear until early next year. Any spot SWU transactions in 1988 will undoubtedly be for delivery well into 1989.

©NUEXCO 1988

NUEXCO

PRICING

US LEGAL AND POLITICAL DEVELOPMENTS SEPTEMBER 1988

Sept. 6 A Federal Appeals Court ruled that the Nuclear Regulatory Commission (NRC) may accept emergency evacuation plans developed by utilities in the absence of their formulation by state and local governments. Litigation arose after Massachusetts Governor Michael Dukakis refused to allow local and state participation in emergency planning for the Seabrook nuclear plant. The ruling may facilitate licensing of other plants which are currently blocked by similar opposition. Since 1980, the NRC has licensed eight plants where state or local governments have refused to participate in emergency plans.

Sept. 14 The Senate Foreign Relations Committee approved the Anti-Apartheid Act Amendment of 1988 (S.2756) by a vote of 10 (Democrats) to 9 (Republicans). The bill is unlikely to reach the Senate floor this session due to time constraints and insufficient support.

Sept. 16 Clearing a major roadblock to Seabrook licensing, the NRC amended its emergency planning regulations to allow operations at up to five percent power at nuclear plants even if emergency sirens are not in place. Sirens placed in some areas near the plant had been dismantled by intervenors.

Sept. 16 The New York State Public Service Commission and the Internal Revenue Service approved the plan to scrap the Shoreham nuclear plant. The State Legislature must still endorse the proposal before it is finalized.

Sept. 19 The US Senate passed the US/Canada Free Trade Agreement (FTA) implementing legislation by a vote of 83 to 9, completing its approval process in Congress.

Sept. 28 President Reagan signed legislation implementing the FTA.

CANADIAN POLITICAL DEVELOPMENTS OCTOBER 1988

Oct. 2 Prime Minister Brian Mulroney dissolved the Canadian Parliament and scheduled a general election for November 21. The central campaign issue is expected to be the FTA, which has been stalled in the Canadian Senate by the opposition Liberal Party leadership. If Mulroney's Progressive Conservative Party retains its majority in the House of Commons, the FTA will pass; however, the opposition parties, if elected, will scuttle the FTA.

© NUEXCO 1988

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)
Australia (dollar)	17.57	17.57	23.16	45.67	45.67	60.20
Belgium (comm. franc)	542.19	554.03	635.74	1,410	1,440	1,652
Canada (dollar)	16.75	17.50	21.83	43.56	45.49	56.75
EEC (ecu)	12.47	12.75	14.75	32.42	33.16	38.34
Finland (markka)	61.06	62.64	73.48	158.73	162.85	191.02
France (franc)	88.08	89.61	101.96	229.00	232.98	265.07
FRG (mark)	25.88	26.41	30.63	67.29	68.66	79.64
Italy (lira)	19,266	19,598	22,112	50,087	50,951	57,485
Japan (yen)	1,847	1,910	2,437	4,803	4,964	6,335
Netherlands (guilder)	29.17	29.81	34.48	75.83	77.51	89.64
South Africa (rand)	34.13	34.37	34.51	88.72	89.35	89.71
Spain (peseta)	1,712	1,748	2,026	4,451	4,544	5,268
Sweden (krona)	88.65	91.17	107.07	230.48	237.03	278.37
Switzerland (franc)	21.91	22.30	25.46	56.97	57.98	66.19
UK (pound)	8.17	8.38	10.22	21.23	21.78	26.58
US (dollar)	13.75	14.15	16.65	35.75	36.79	43.29

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)
Australia (dollar)	18.52	18.62	25.31	48.16	48.41	65.81
Belgium (comm. franc)	571.77	587.31	694.92	1,486	1,527	1,807
Canada (dollar)	17.67	18.55	23.86	45.93	48.22	62.03
EEC (ecu)	13.15	13.52	16.12	34.18	35.15	41.91
Finland (markka)	64.39	66.40	80.32	167.39	172.63	208.81
France (franc)	92.89	95.00	111.45	241.49	246.97	289.75
FRG (mark)	27.30	28.00	33.49	70.97	72.78	87.06
Italy (lira)	20,317	20,776	24,170	52,819	54,012	62,837
Japan (yen)	1,948	2,024	2,664	5,065	5,263	6,925
Netherlands (guilder)	30.76	31.61	37.69	79.97	82.17	97.98
South Africa (rand)	35.99	36.43	37.72	93.56	94.72	98.06
Spain (peseta)	1,805	1,853	2,245	4,693	4,817	5,758
Sweden (krona)	93.49	96.65	117.04	243.05	251.27	304.28
Switzerland (franc)	23.11	23.64	27.83	60.07	61.46	29.05
UK (pound)	8.61	8.88	11.18	22.39	23.09	27.93
US (dollar)	14.50	15.00	18.20	37.70	39.00	47.32

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month.

© NUEXCO 1988

NUEXCO

CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb U as UF_6			per kg U as UF_6		
	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)	This Month (Sept 30, 1988)	Last Month (Aug 31, 1988)	12 Months Ago (Sept 30, 1987)
Australia (dollar)	2.49	2.42	2.64	5.49	5.34	5.83
Belgium (comm. franc)	76.89	76.35	72.55	169.52	168.32	159.94
Canada (dollar)	2.38	2.41	2.49	5.24	5.32	5.49
EEC (ecu)	1.77	1.76	1.68	3.90	3.87	3.71
Finland (markka)	8.66	8.63	8.38	19.09	19.03	18.49
France (franc)	12.49	12.35	11.64	27.54	27.23	25.65
FRG (mark)	3.67	3.64	3.50	8.09	8.02	7.71
Italy (lira)	2,732	2,701	2,523	6,024	5,954	5,563
Japan (yen)	261.99	263.16	278.06	577.59	580.16	613.02
Netherlands (guilder)	4.14	4.11	3.93	9.12	9.06	8.67
South Africa (rand)	4.84	4.74	3.94	10.67	10.44	8.68
Spain (peseta)	242.78	240.86	231.23	535.23	531.00	509.77
Sweden (krona)	12.57	12.56	12.22	27.72	27.70	26.94
Switzerland (franc)	3.11	3.07	2.91	6.85	6.78	6.40
UK (pound)	1.16	1.15	1.17	2.55	2.55	2.57
US (dollar)	1.95	1.95	1.90	4.30	4.30	4.19

SWU VALUE AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

	SWU Value at 0.30% Tails Assay This Month (September 30, 1988)	SWU Value at 0.30% Tails Assay Last Month (August 31, 1988)	UF_6 Value per kg U as UF_6 This Month (September 30, 1988)	UF_6 Value per kg U asUF_6 Last Month (August 31, 1988)
Australia (dollar)	83.04	80.70	52.05	50.90
Belgium (comm. franc)	2,563	2,545	1,607	1,605
Canada (dollar)	79.20	80.38	49.65	50.69
EEC (ecu)	58.94	58.58	36.95	36.95
Finland (markka)	288.63	287.74	180.95	181.49
France (franc)	416.40	411.65	261.05	259.65
FRG (mark)	122.36	121.31	76.71	76.52
Italy (lira)	91,075	90,028	57,097	56,787
Japan (yen)	8,733	8,772	5,475	5,533
Netherlands (guilder)	137.89	136.96	86.44	86.38
South Africa (rand)	161.33	157.88	101.14	99.58
Spain (peseta)	8,093	8,029	5,073	5,064
Sweden (krona)	419.08	418.81	262.73	264.17
Switzerland (franc)	103.59	102.44	64.94	64.61
UK (pound)	38.61	38.48	24.20	24.27
US (dollar)	65.00	65.00	40.75	41.00

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month.

© NUEXCO 1988

RECENT TRANSACTIONS[1]

URANIUM SALES

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Exchange or UF_6 Value[2]	Seller	Buyer	Remarks
4372	1988	less than 50	98-102	Intermediary	Utility	US Origin
4373A	1989	50-100	See Remarks	Intermediary	Utility	Contained in Low-Enriched Uranium
4376	1988	50-100	103-107	Producer	Intermediary	US Origin
4381	1988	less than 50	98-102	Intermediary	Utility	UF_6
4383	1988	101-300	98-102	Intermediary	Utility	
4384	1991-95	1,001-1,500	See Remarks	Producer	Utility	Base-Price Escalated
4385	1992-95	301-500	See Remarks	Producer	Utility	Market-Related Pricing
4388	1988	101-300	98-102	Intermediary	Utility	UF_6
4389	1988	50-100	98-102	Intermediary	Utility	US Origin

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF_6 Value) *plus* the premium (relative to the Exchange Value or UF_6 Value). The range reflects five percentage points (inclusive) per grouping, centered about the middle of the range.
[3] The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.

© NUEXCO 1988

NUEXCO

CURRENT MARKET DATA

LOAN TRANSACTIONS

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Loan Rate	Lender	Borrower	Remarks
No loan transactions are reported this month.						

CONVERSION SERVICES SECONDARY MARKET SALES

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price Range as Percent of Current C.V.	Seller	Buyer	Remarks
4382	1988	101-300	93-97	Intermediary	Utility	

ENRICHMENT SERVICES SECONDARY MARKET SALES

Nuexco Transaction Number	Delivery Period	Approximate Quantity[4] (thousands of SWU)	Approximate Price Range as Percent of Current SWU Value[5]	Seller	Buyer	SWU Origin	Remarks
4369	1988	less than 50	108-112	Intermediary	Utility	DOE	
4373B	1989	less than 50	See Remarks	Intermediary	Utility		Contained in Low-Enriched Uranium
4375	1988	less than 50	108-112	Intermediary	Intermediary	DOE	
4386	1990-92	101-300	98-102	Intermediary	Utility		

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF_6 Value) *plus* the premium (relative to the Exchange Value or UF_6 Value). The range reflects five percentage points (inclusive) per grouping, centered about the middle of the range.
[3] The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.
[4] If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[5] Prices are usually normalized to 0.30% tails assay. Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.

© NUEXCO 1988

URANIUM SUPPLY
(September 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale			
ACTIVE			
87-1002	270	—	1988
87-1068A	1,000	—	1988, UF_6e
87-1123	1,000	1,000 per year	1989 on
87-1141	500	200 per year	1989-92
88-1000A*	250	—	1988
88-1000B	200	—	1988, UF_6
88-1001	200	—	1988
88-1036	100	—	1988
88-1078	1,200	—	1988
88-1153	100	—	1989
88-1157	1,000	1,000 per year	1989 on, UF_6
87-1000*	—	500 per year	1990-93
87-1001	—	500 per year	1989 on
87-1005	—	250 per year	1989-95
87-1061	—	700 per year	1989 on
Total	**5,820**		
INACTIVE			
87-1019	1,000	1,000 per year	1988-91
87-1053	100	500 per year	1989 on
88-1026	250	—	1988
88-1033A	130	—	1988, UF_6e
87-1130	—	580	1989
88-1064*	—	250 per year	1990-95
88-1096A	—	290	1990, UF_6e
Total:	**1,480**		

* New or revised since last month.
[1] Measured from the date of this Report.
[2] For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 88-1041, 88-1122, 88-1155.

© NUEXCO 1988

NUEXCO

CURRENT MARKET DATA

URANIUM DEMAND
(September 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
87-1154A	44	—	1988, UF_6e
88-1115	325	—	1988
88-1148*	75	—	1988, UF_6
88-1151	100	—	1988, UF_6
88-1154*	250	—	1989
88-1163*	100	—	1988, UF_6
88-1179*	80	—	1988
87-1021*	—	100 per year	1992-99
88-1089	—	1,200 per year	1990-95
88-1107A	—	100	1989, UF_6e
88-1161*	—	500+ per year	1993-98
88-1180*	—	200 per year	1991-95
Total:	**974**		
INACTIVE			
88-1084*	800	—	1989-94
88-1103*	250	—	1939
88-1159*	260	—	1989, UF_6
87-1134*	—	150	1989-90, U_3O_8/UF_6
Total	**1,310**		

* New or revised since last month.
[1] Measured from the date of this Report.
[2] For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 88-1126, 88-1133, 88-1144, 88-1147, 88-1149A, 88-1156.

© NUEXCO 1988

LOAN SUPPLY AND DEMAND
(September 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
87-1012	1,000	—	U_3O_8
87-1031*	1,000	—	U_3O_8
87-1157*	500	—	U_3O_8
88-1135*	300	—	U_3O_8
88-1139	150	—	U_3O_8
Total:	**2,950**		
INACTIVE			
87-1033	1,000	—	U_3O_8
Total:	**1,000**		

Available to Borrow:

No inquiries to borrow are reported.

* New or revised since last month.
[1] Measured from the date of this Report.
Projects removed since last month: 88-1057

© NUEXCO 1988

NUEXCO

CURRENT MARKET DATA

CONVERSION SUPPLY AND DEMAND
(September 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale			
ACTIVE			
88-1181*	660	—	1989-90
Total	**660**		
INACTIVE			
87-1008	770		1988
Total:	**770**		
Inquiries to Purchase			
ACTIVE			
88-1034*	110	5,000	1990-95
88-1158*	425	1,000 per year	1989-93
88-1178*	2,000	3,000 per year	1990-92
Total:	**2,535**		
INACTIVE			
88-1113*	660	—	1989
88-1169*	340	—	1988-89
Total:	**1,000**		

* New or revised since last month.
[1] Measured from the date of this Report.
Projects removed since last month: 88-1021, 88-1127.

© NUEXCO 1988

SWU SUPPLY AND DEMAND
(September 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of SWU) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale			
ACTIVE			
87-1068B	250	—	1988, UF6e
88-1065	500		1990, UF6e
88-1138*	140	140 per year	1989-95
Total	**890**		
INACTIVE			
87-1128	360	—	1988
88-1033B	15	—	1988, UF6e
88-1082	25	—	1988
88-1096B*		55	1990, UF6e
Total:	**400**		
Inquiries to Purchase			
ACTIVE			
87-1154B	10	—	1988, UF6e
88-1085	10	—	1988
88-1107B	60	—	1989, UF6e
88-1077	—	70	1989-91
Total:	**80**		
INACTIVE			
None reported			

* New or revised since last month.
[1] Measured from the date of this Report.
[2] For delivery within one year. This category excludes SWU deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 87-1058, 88-1149B.

© NUEXCO 1988

NUEXCO

RECENT DEVELOPMENTS

FEDERAL REPUBLIC OF GERMANY (FRG)

Pro-Nuclear Bavarian Premier Dies

Franz Josef Strauss, Premier of Bavaria since 1978, died on October 3, 1988 at the age of 73. Strauss had been Chairman of the Christian Social Union (CSU), the Bavarian sister party of Chancellor Helmut Kohl's Christian Democratic Union (CDU), since 1961. In conjunction with the Free Democratic Party (FDP), headed by Hans-Dietrich Genscher, the CSU and CDU constitute the current coalition government in the country. Strauss was one of the most outspoken advocates of the FRG nuclear program, and his presence, particularly in view of rising anti-nuclear factions, will be missed. He endorsed the Wackersdorf reprocessing plant in Bavaria and had been campaigning for its completion.

* * *

Operating License Revoked for Muelheim-Kaerlich

On September 9, the FRG's Superior Administrative Court in Berlin revoked the partial operating license of Rheinisch-Westfaelisches Elektrizitaetswerk AG (RWE) for its PWR at Muelheim-Kaerlich. The only nuclear reactor in the State of Rheinland-Palatinate was shut down on the grounds that safety issues were improperly addressed during the licensing process. As a result, RWE must now reapply for an operating license — an expensive and lengthy process. Nuclear sentiment in Rheinland-Palatinate apears to be more favorable than in Schleswig-Holstein, however, which may be a factor in expediting the reactor's startup.

This is the second time Muelheim-Kaerlich has been shut down on procedural grounds; the first was in October 1986 for improper procedures followed in licensing cooling towers. Intervenors were responsible for the court actions on both occasions and have filed more than 5000 separate actions since 1975. Over the past 12 years, RWE has lost millions of dollars from licensing delays even though the complaints were filed against the licensing officials —not RWE.

* * *

Use of MOX Fuels Delayed by SPD

The SPD has also been instrumental in halting and preventing the use of mixed-oxide (MOX) assemblies in the three Schleswig-Holstein nuclear reactors. In August, Preussenelektra was unable to complete a planned reload of four MOX assemblies at Brokdorf because of opposition from Minister of Energy and Social Affairs Guenther Jansen who barred the use of any MOX assemblies containing plutonium of different origins. (The planned Brokdorf reload apparently contained plutonium reprocessed at two different facilities.)

Hamburgische Electricitaets-Werke Ag (HEW), admittedly influenced by SPD tactics, recently decided to postpone using MOX fuels at the other two State reactors—Bruensbuettel and Kruemmel.

The delays will set back the West German national plutonium recycling program which calls for the drawdown of the national plutonium stockpile, stored by Siemens in Hanau, by 1995. At that time, additional plutonium, which will have been reprocessed at Cogema's UP-3 facility scheduled for startup in 1989, will be added to inventory.

The SPD-imposed roadblocks to the national program are also in direct violation of the German Atomic Act which provides for a closed fuel cycle. Consequently, the ban against MOX fuel usage may be short-lived.

More than one-third of the MOX assemblies (456 assemblies) scheduled for reload through 1995 are for the three Schleswig-Holstein reactors. Only Brokdorf is currently licensed to load recycled fuel.

* * *

©NUEXCO 1988

Federal Order Allows Brokdorf Operation

Overruling state nuclear officials for the first time, Federal Minister of Environment and Nuclear Safety (BMU) Klaus Toepfer ordered on August 26 the resumption of operations at the 1250-MWe Brokdorf PWR located in Schleswig-Holstein.

Alleging safety concerns, Guenther Jansen, Minister of Energy and Social Affairs for the newly-elected Social Democrat (SPD) government in Schleswig-Holstein, blocked the restart of the Brokdorf unit, which was shut down July 1, 1988 for its first refueling. Several fuel assembly spacer pieces as well as some centering guide pins broke off during refueling and were assumed to have fallen into the reactor core.

According to the Northern German Technical Inspection Association (TUeV) and the Society for Reactor Safety (Gesellschaft für Reaktorsicherheit), these problems posed no threat to safe operations and provided insufficient justification for barring the reactor's startup. Preussenelektra AG, the majority owner (80 percent) of Brokdorf, said that similar breakage incidents had occurred numerous times in other FRG reactors and had never before stalled operations.

Preussenelektra estimates that the unexpected 22-day downtime cost it approximately US $3,500,000 (or $160,000/day) for replacement power, and the utility has considered filing for damages. The Brokdorf unit currently provides approximately 25 percent of Preussenelektra's baseload power.

The SPD gained a majority in the Schleswig-Holstein elections last May, pledging to close down all nuclear power plants in the State (See NUEXCO Report No. 238). It is believed that Jansen had hoped to further SPD nuclear phase-out objectives by demonstrating the dispensability of Brokdorf while it was idled. The reactor's expendability will be difficult to substantiate, however, since electricity sales in Schleswig-Holstein were more than double the Federal average in 1987.

* * *

FINLAND

Industrial Sector Supports Additional Nuclear Plants

In anticipation of the 1991 elections, representatives from Finland's energy-intensive industrial sector (which is one of the world's greatest energy consumers per unit of output) are garnering support for the commissioning of additional nuclear power plants.

Following Chernobyl, public opposition grounded plans for construction of a fifth nuclear reactor in Finland, and the coalition government that was elected in 1987 deferred consideration of any new nuclear units until the end of its four-year term. However, Finland's new atomic energy act which went into effect March 1, 1988, provides parliament rather than the ruling government with the power to approve new nuclear plants, although, in order to proceed, parliament must have the support of local authorities at the proposed plant site.

The paper and pulp companies, many of which own small power plants that use combinations of industrial waste, coal, oil, and peat, are among nuclear energy's current supporters. In addition, the Trade and Industry Minister has recommended adding a new nuclear plant before the end of the century. Based on Finland's projected annual growth rate in power demand of three to four percent through the year 2000, an additional capacity of 2200 MWe will be needed by the turn of the century.

Of Finland's four nuclear units, Imatran Voima Oy (IVO) operates two 430-MWe PWRs located at Loviisa on the south coast between Helsinki and the Russian border. The two Swedish-designed 710-MWe BWR's on the west coast at Olkiluoto are operated by Teollisuuden Voima Oy (TVO).

Finland has one of the safest and most efficient nuclear reactor operating records in the world and, in 1987, reported an average load factor of 92.1 percent. The same year, nuclear energy provided approximately 37 percent of all electricity generated in Finland.

* * *

© NUEXCO 1988

REPUBLIC OF SOUTH AFRICA

South Africa Averts IAEA Suspension

The Republic of South Africa avoided expulsion from the International Atomic Energy Agency (IAEA) by expressing its "objective and desire" (as opposed to its "hope" a year earlier) to sign the Nuclear Nonproliferation Treaty (NPT), provided some of its "concerns" could be alleviated. At its 32nd General Conference held in September 1988, the IAEA approved a resolution proposed by Egypt on behalf of the African States requesting Director General Hans Blix to "continue to take all possible measures" to encourage South African compliance with IAEA safeguards, and to review the situation again in September 1989. The resolution passed by a vote of 58 for, 29 against (the OECD countries and Israel), and 4 abstaining.

South Africa's refusal to comply with full-scope IAEA safeguards has long been a contentious issue, and the IAEA has pressed South Africa to sign the NPT since all NPT signatory countries are required to submit their nuclear facilities to IAEA inspection. Although South Africa permits two of its nuclear installations—the Koeberg plant near Cape Town and the Safari I nuclear research station near Pretoria—to undergo IAEA inspection, it is the semi-commercial enrichment plant at Valindaba that is the focal point of international concern, because it allegedly is capable of producing weapons-grade material. According to South Africa, Valindaba has not yet commenced commercial operations, although it is eventually expected to produce 300,000 SWU per year.

It is unlikely that South Africa will sign the NPT in the near future unless it receives some guarantee:

- that international trade sanctions against South African-origin uranium imports will be lifted, enabling it to compete freely in the international marketplace like other NPT signatories, and
- that it will be allowed to share the peaceful nuclear technology of the Nuclear Weapon States (USA, UK and USSR) in accordance with Article IV of the NPT. The transfer of peaceful nuclear technology is currently limited by United Nation resolutions which ban all nuclear cooperation with South Africa.

Under the current international political climate, as long as apartheid remains in force, there appears little chance for removal of South African trade sanctions. Unless South Africa independently resolves its concerns, its IAEA membership is likely to become increasingly tenuous. ■

© NUEXCO 1988

A MODEST BUT STABLE US URANIUM INDUSTRY

By George White, Jr. & Treva E. King

Following is an edited version of the paper presented by George White, Jr. at the Thirteenth Annual Symposium of the Uranium Institute in London on September 8, 1988.

In 1978 a consensus estimate of 1988 WOCA uranium requirements was about 77,000 tonnes U (MTU), with US requirements estimated at 31,000 MTU. At that time, these estimates were viewed as being very conservative — a low case scenario that took full account of the overly optimistic forecasting so prevalent in previous years. These "very conservative" estimates turned out, however, to be wildly optimistic themselves. Actual 1988 consumption will only be about 42,000 MTU for WOCA, and only 15,000 MTU in the USA. Production forecasts, both for WOCA and the USA, were equally in error. As a consequence, this paper, which focuses on US production, will proceed with an appropriate extra degree of caution.

Before dealing with the "when", the "how much" and the "circumstances" of future US uranium production, I suggest the following as realistic, non-argumentative boundaries for our discussion.

- US uranium consumption is not growing; US consumption, now 15,000 MTU, will average only about 16,000 MTU annually through the year 2000.
- With a few obvious exceptions, US uranium deposits are smaller, lower grade, and more costly to produce than those in Canada, Australia, and Africa.
- US uranium resources are adequate, however, given sufficient price incentive, to supply 100 percent of US needs by 1993.
- There are almost no conceivable circumstances under which US production would exceed US consumption (or about 16,000 MTU annually).
- The actual level of US uranium production will be a function of commercial as well as legislative, political, judicial, and/or other non-commercial developments in the US and other supplying nations, over which US market participants will have little, if any, control.

Before focusing on supply, let me touch briefly on the matter of US uranium consumption. That annual US consumption will plateau at about 16,000 MTU, simply reflects the fact that there are no new reactors planned or being built in the USA. If anything, this projected level of demand is optimistic. Reactor cancellations or retirements, fuel improvements, and the lower tails assays associated with lower SWU prices and/or laser enrichment all suggest reduced uranium usage that almost surely will pre-date increased demand associated with any new reactor orders.

As regards US production, I would state my basic thesis as follows:

> In the free market environment that is expected to prevail in the USA, US production is expected to stabilize at approximately 40 percent of US consumption, or about 6,500 MTU annually.

In the context of this paper and so far as US market participants are concerned, a "free market environment" is one in which there are no origin restrictions or where any existing restrictions do not lead to premium prices for US-origin uranium as a consequence of the need to procure such material sooner or in greater amounts that would be the case, absent such restrictions. While this may seem obvious, it should be noted that an "effective" free market can exist with restrictions.

In this regard, it is a generally held view and, I believe, demonstrably true that no significant price premium for US-origin uranium can be sustained unless government-imposed import restrictions result in the requirement that more than 50 percent of US consumption be filled by US uranium on a continuing basis. Or, stated positively, if import restrictions are to be effective in forcing a price premium for US-origin uranium, such restrictions must, at a minimum, result in US production exceeding 8,000 MTU annually.

The bases for our expectation of a free market environment in the US are these:

- From a practical standpoint, the June 1988 Supreme Court ruling in favor of DOE effectively ended any chance that Section 161(v) of the Atomic Energy Act will be issued as a vehicle to prohibit imports of non-US origin uranium for use in US reactors prior to resolution of the FTA issue. While most observers agree that the US producers would eventually prevail in this case, given the time to see it through to its final conclusion, other events will likely moot such an effort.
- The principal such event is the passage of the US/Canada Free Trade Agreement, without any special language to support or protect the US uranium production industry.
- Finally, there seems to be little chance that the US Congress will pass legislation in the foreseeable future to support or protect the US uranium industry. The requisite political support simply does not appear to exist.

© NUEXCO 1988

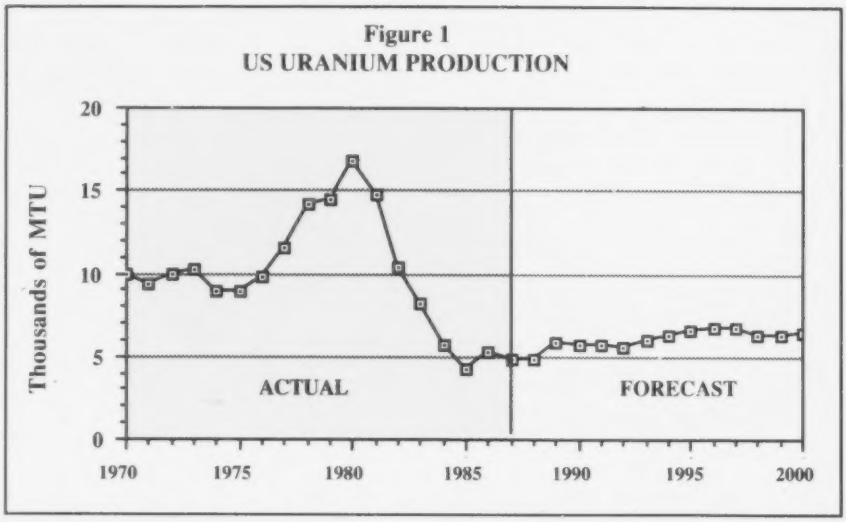
NUEXCO

ANALYSIS AND COMMENTARY

Our belief that US production will stabilize at about 6,500 MTU annually results from analysis of a number of related factors including: forecasts of demand and requirements, existing contractual commitments, uranium production cost estimates, price projections, origin preferences, and expected political developments in producing nations.

To begin, Figure 1 depicts the history of US uranium production from 1970 to 1987, as well as our projection through the year 2000. Of greater interest and perhaps more instructive is Figure 2 which illustrates historical and projected US production as a percentage of WOCA production. What is most clear is the erosion of the once-dominant US position. From 53 percent in 1970, the US share of WOCA production slipped to 46 percent by 1975, and to 38 percent by 1980, before plummeting to 12 percent in 1985. And, in the projected free market case, we see that US production will stabilize in the range of 13 to 15 percent of WOCA through the year 2000.

Figure 1
US URANIUM PRODUCTION

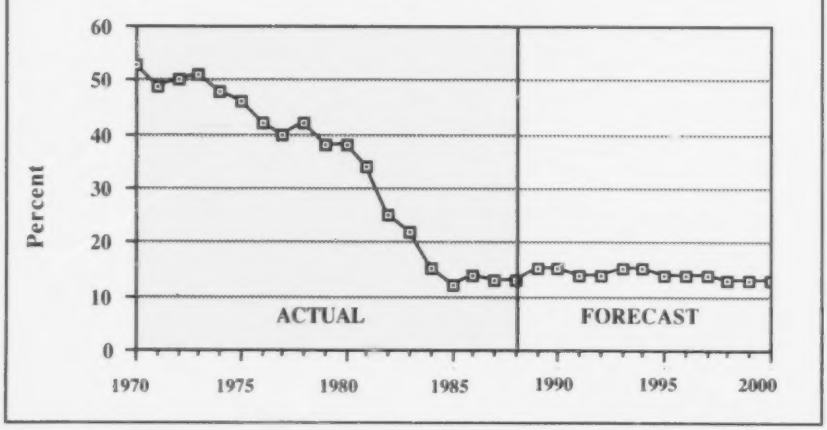


Between 1980 and 1985 alone, US production dropped by about 75 percent from 16,800 to 4,300 MTU. What happened? Having expanded in response to prices of $40 per pound U3O8, the US industry collapsed when prices subsided to the sub-$20 level. In 1980, total WOCA production was 44,200 MTU, with 16,800 from the USA and 27,400 from other nations. In 1985, WOCA production was only 35,000 MTU, 9,200 less than in 1980. But the US total declined 12,500 MTU (from 16,800 to 4,300), while the rest of the nations increased their aggregate share by some 3,300 MTU (from 27,400 to 30,700). This is a classic example of inefficient, high-cost production being displaced by more efficient, lower-cost production. In fact, some US producers shut down operations in favor of meeting their delivery commitments with uranium which they were able to purchase in the open market at prices below their own costs of production.

In this free market scenario, US uranium production will comprise three main elements between now and the year 2000:

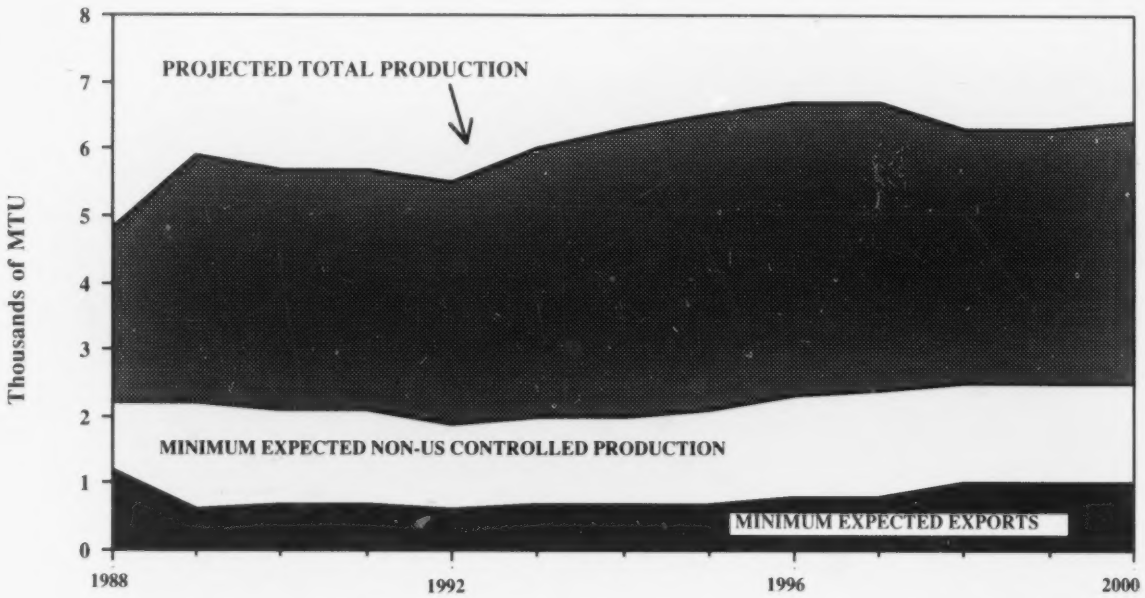
- conventional production, dominated by higher grade underground mines;

Figure 2
USA AS A PERCENT OF
WORLD URANIUM PRODUCTION



© NUEXCO 1988

Figure 3
TOTAL PROJECTED US PRODUCTION, NON-US CONTROLLED PRODUCTION, AND EXPORTS OF URANIUM



• increased output from an expanding group of in-situ producers;

• a gradual shutdown of high-cost production, including most by-product operations, as current contracts expire.

Mines and mills, currently shutdown or on standby, are unlikely to reopen — the victims of high costs, environmental considerations, and deteriorating facilities. Overall, production emphasis in the USA will increasingly switch to smaller, more flexible, and lower-cost operations.

However, the future of the US uranium industry is not near as bleak as might be inferred from a first inspection of Figure 2. In fact, changes that will contribute to stabilizing the US industry are already well underway. First and foremost has been the emergence of a number of non-US organizations which, by their actions, have demonstrated that they view the USA as an important source of long-term uranium supply. To wit:

• RTZ's Rio Algom unit has been a long-time US producer.

• Cogema's recent purchase of a controlling interest in Saarberg Interplan has expanded a US position that started with the purchase of Pathfinder.

• Total, the other French connection, has two existing US operations and is reportedly looking at further acquisitions.

• Three Swiss utilities have long-time relationships with Energy Fuels' Arizona Strip operations.

• Korean and German interests have acquired important equity positions in Nebraska's Crow Butte deposit.

• CEGB has uranium supply contract with two US producers and also holds property interests in Wyoming.

Though not exhaustive, this list suffices to make the point.

This foreign involvement in the US market is reflected in Figure 3 which shows total projected US production together with both the portion to be exported by US producers and the portion controlled by non-US entities. These data demonstrate our expectation that non-US entities will continue to play a significant role in the US

© NUEXCO 1988

uranium industry—both as purchasers and owners. Based on recent developments, however, I judge that we may still be underestimating the degree of control that will be exercised by such non-US organizations.

Why this apparently growing interest in obtaining US supply and investing in US resources when less costly production is obviously available elsewhere, and US companies themselves appear discouraged? Reasons include:

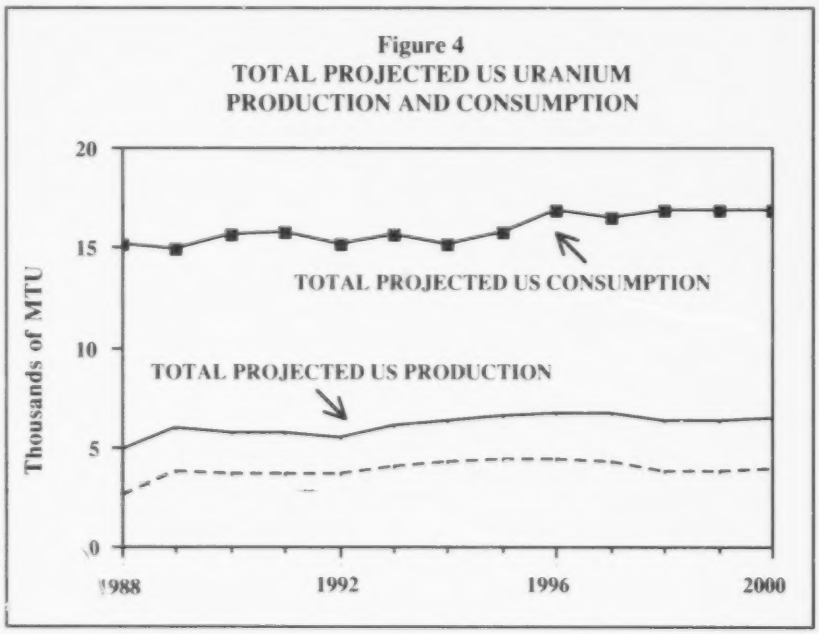
- For the most part, the foreign groups active in the US represent countries lacking indigenous resources and, consequently, are more sensitive to assurance and diversity of supply considerations.
- From a political standpoint, the US represents the single most reliable source of uranium supply. Unlike Australia and Canada, there are no foreign investment limitations or considerations and no provisions for government oversight, approval, or interference in the commercial terms and conditions that may be negotiated between buyers and sellers.
- Technological advances, particularly in the field of in-situ leaching, have reduced production costs of some US deposits to more competitive levels. Further, obtaining this technology has become an end in itself.
- The weakened US dollar has created a unique window of opportunity for foreign investors and buyers, just at the time that numerous properties and projects in the USA are available as a consequence of decisions by domestic organizations to leave the uranium business.

In addition and reacting to these circumstances, some US producers have adopted more aggressive and apparently successful, internationally-oriented marketing strategies, seeking buyers who are concerned more with supply assurance than the current level of spot prices. Indeed, while many may disagree, others would argue that it is this very preoccupation with the spot market and spot market pricing that is a primary cause of the boom/bust cycles that have characterized the history of the uranium industry.

Returning to the production equation, and given the projected, relatively stable level of US production, it is a simple matter to calculate that portion of US demand that will be supplied by non-US sources. Figure 4 compares projected US consumption and production. The upper area represents the market available to non-US suppliers, and totals nearly 130,000 MTU through the year 2000. Note that US production is divided into two segments. The upper one represents that portion of US production projected to be exported, plus that portion of US production that is controlled by non-US entities and is, presumably, most available for export. Were all this material, in fact, exported, nearly 155,000 MTU of non-US origin material would be needed to satisfy US requirements.

Quantifying total US imports is not difficult. Predicting the specific sources of those imports is quite another matter. It is, however, possible to offer certain observations with some degree of confidence. For the foreseeable future, Canada will continue to dominate; its share of the US market could easily grow to or exceed 40 percent, or about 6,400 MTU annually. Canada's principal competition will come from increasingly aggressive Australian suppliers. Others who could potentially play major roles in the US market include: Namibia (provided the political situation there is resolved in a manner acceptable to the US government), China (assuming no

Figure 4
TOTAL PROJECTED US URANIUM PRODUCTION AND CONSUMPTION



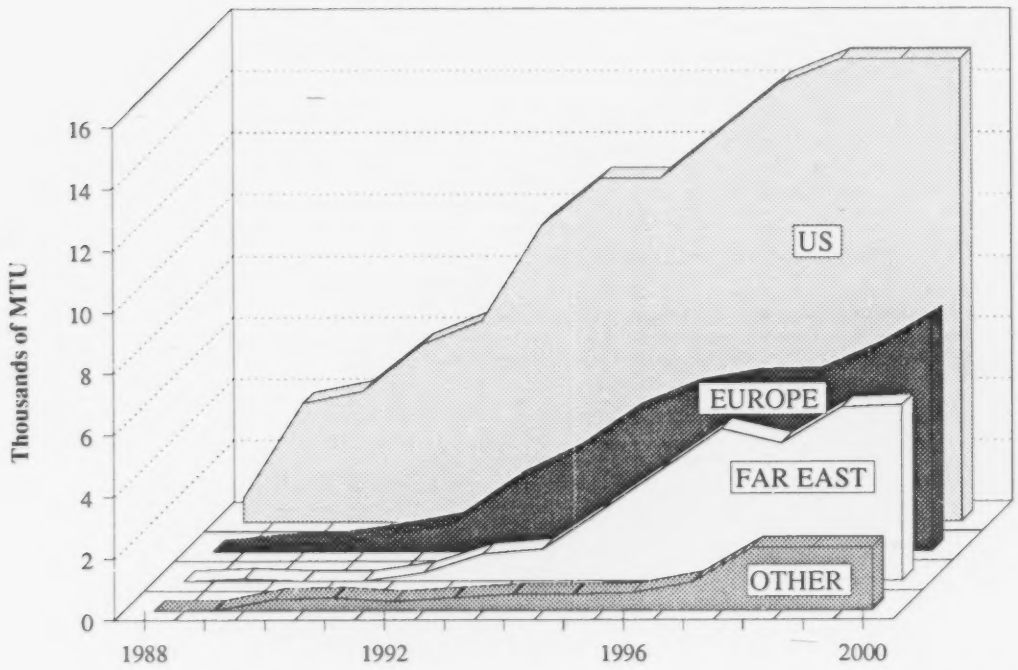
© NUEXCO 1988

change in its currently-enunciated decision to become a world class supplier), and Russia (particularly as a seller of enriched product).

While the US uranium production industry will never return to its former dominance, the unfilled uranium needs of the US nuclear power industry will continue to dominate as shown in Figure 5. And, though lacking the large tonnage and higher grades found in Canada and Australia, US uranium resources will continue to hold some considerable attraction as a consequence of a history, in the United States, of political stability and non-interference in commercial matters. Finally, it should be noted that the current US producers are proving, by and large, to be a hardy, efficient, and cost-conscious lot.

Albeit of modest size, there will be a US uranium industry. ■

Figure 5
UNFILLED URANIUM REQUIREMENTS
BY REGION



© NUEXCO 1988

NUEXCO

ANALYSIS AND COMMENTARY

CANADIAN URANIUM AND THE US MARKET

By Clark M. Beyer

The following is a slightly edited version of a speech presented by NUEXCO Commercial Representitive Clark Beyer to the Canadian Nuclear Society's International Symposium on Uranium and Electricity in Saskatoon, Canada, on September 21, 1988.

Introduction

Canada and the United States are each others' largest trading partners. Across the longest undefended border in the world, each nation has invested over thirty billion dollars in its neighbor's economy. Trade in the energy sector is a major part of this relationship. For the last several years, Canada has produced far more uranium than any other region in the world.

Since free trade in uranium has been in effect in the USA, Canada's role as a supplier to the USA has increased substantially, and the USA currently imports more uranium from Canada than from any other nation. But in recent years, renewed attempts to protect the US uranium production sector have threatened to restrict or eliminate Canadian uranium sales to the USA, representing a threat to as much as one-third of Canada's uranium export market. These events have resulted in confusion among US utilities as to procurement decisions, and, depending upon the outcome of these political factors, could have a serious impact on sales and the price of Canadian-origin uranium over the next decade.

The US Market

Despite a far smaller industry than originally planned, the United States still has the largest nuclear capacity in the world. As of mid-1988, 104 nuclear units were in operation in the USA, representing annual uranium consumption of approximately 38 million pounds (14,600 MTU). Figure 6 shows NUEXCO's forecast of uranium consumption through the 1990s. As you can see, the US nuclear power industry has essentially completed its growth stage. Recurring regulatory and licensing problems, plant construction cost overruns, and the lack of strong public support for nuclear power in the wake of the Three Mile Island and Chernobyl accidents have led to a retrenching on the part of the US nuclear industry. On the positive side, the rash of reactor cancellations in the late 1970s and early 1980s has practically ended, and at least nine of the fifteen reactors still under construction should be in operation by 1995. As a result, uranium demand in the USA should stabilize at about 40-million pounds U_3O_8 (15,400 MTU) per year for the next decade.

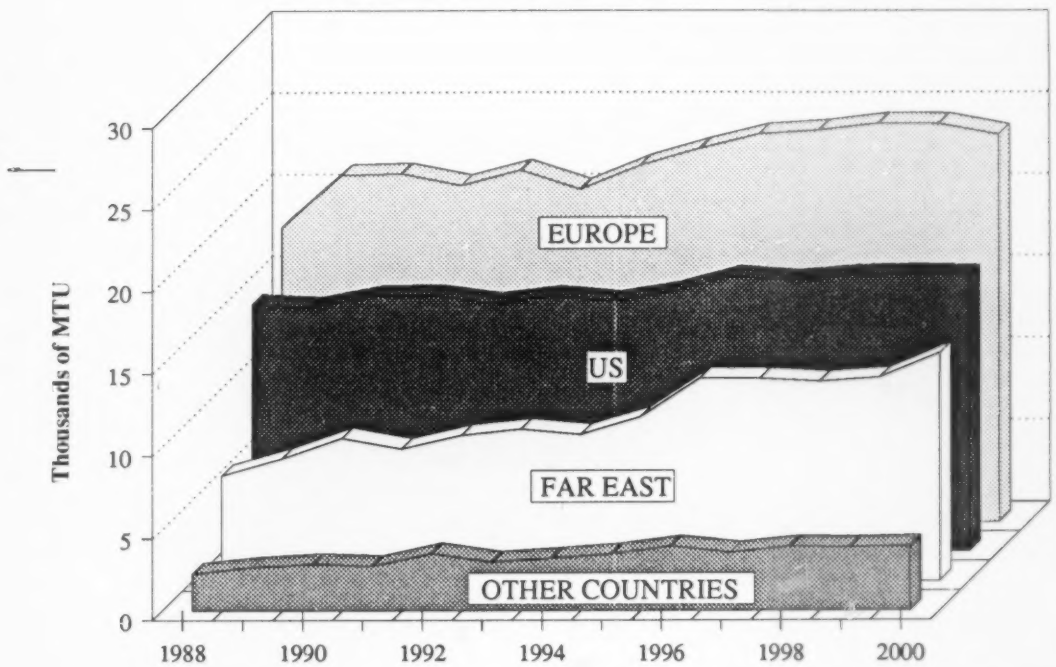
Two other factors will determine the level of buying activity undertaken by US utilities in the 1990s—inventory levels and unfilled requirements. While uranium inventory levels still remain quite high among some US utilities, some on the order of five years' or more forward supply, the overall US inventory level has been reduced considerably in recent years. The current figure for uranium inventories in the USA is estimated by NUEXCO at roughly 110 million pounds U_3O_8 equivalent, or about 42,300 MTU. Of this total, about four-fifths is in the hands of utilities and one-fifth in the hands of producers. NUEXCO excludes material in the pipeline or in process from this estimate.

This inventory reduction has been partly due to ever-increasing consumption on the part of US utilities. Since 1984, more than 25 units have entered commercial operation. Uncertainties in the markets for both spot and long-term contracting have also encouraged inventory drawdown of late, as utilities have adopted a wait-and-see approach to the complicated issue of origin. As these legal and political uncertainties have persisted, many utilities have purchased only what is necessary for reactor operations, and have either preserved, purchased, or swapped enough US-origin material to carry them through a period of restrictions.

For the same reasons, longer-term contracting has been proceeding rather slowly in the last few years, especially considering the large amount of unfilled requirements in the mid-1990s (please refer to Figure 5 of the previous article). As is evident by this chart, US utilities are almost entirely uncovered for uranium after about 1995, and will need to purchase more than 15 million pounds of U_3O_8 equivalent to fill 1993 requirements. Whether that contracting will occur now or in 1992 is likely to depend on the resolution of the legal and political issues now hampering US utilities. Nevertheless, it is clear that US

© NUEXCO 1988

Figure 6
ANNUAL WORLD URANIUM CONSUMPTION



utilities will need to acquire a great deal more uranium for the 1990s than will Europe and the Far East combined. By briefly examining the US uranium production sector, it is evident that if the current state of the US industry continues, US producers will be able to meet only about 30 percent of US utility needs in the 1990s. US uranium production has fallen sharply since 1980 (Figure 1 of previous article), and exploration activity is at an all-time low. Those still engaged in uranium production have been forced to retrench, scale down operations, and only produce the most economical pounds. Conventional mining operations have shrunk as by-product and solution mining operations, typically less capital intensive, represent an increasing share of US production. More than 75 percent of US production in 1982 came from conventional operations; that figure dropped to about sixty percent in 1987. Only five conventional mills produced U_3O_8 concentrates in 1987, and most of them operated on a part-time basis.

Under current market conditions, and given the relatively poor average ore grades in the USA, NUEXCO expects that US producers will maintain a production level of roughly thirteen million pounds or five thousand tonnes per year through the early to mid-1990s. Conventional operations in the Arizona Strip and New Mexico, and to a lesser degree in Texas and Wyoming, should account for about half of this amount, with the balance coming from solution mining operations in Texas, Wyoming, and Nebraska, and phosphate by-product operations in Florida and Louisiana. Under such a scenario, US utilities would need to depend on imports and inventory drawdown for two-thirds of their needs in the 1990s.

Canada's Status as a Uranium Producer

In contrast to the rather grim future for US producers under free-market conditions, the outlook for Canadian uranium appears better than ever. In 1987, for the fourth year in a row, Canada led the world in uranium production, accounting for more than one-third of all U_3O_8 production worldwide. That achievement has firmly established Canada as the world leader, and the discovery

© NUEXCO 1988

of larger and richer deposits in Saskatchewan should assure that position well into the next century.

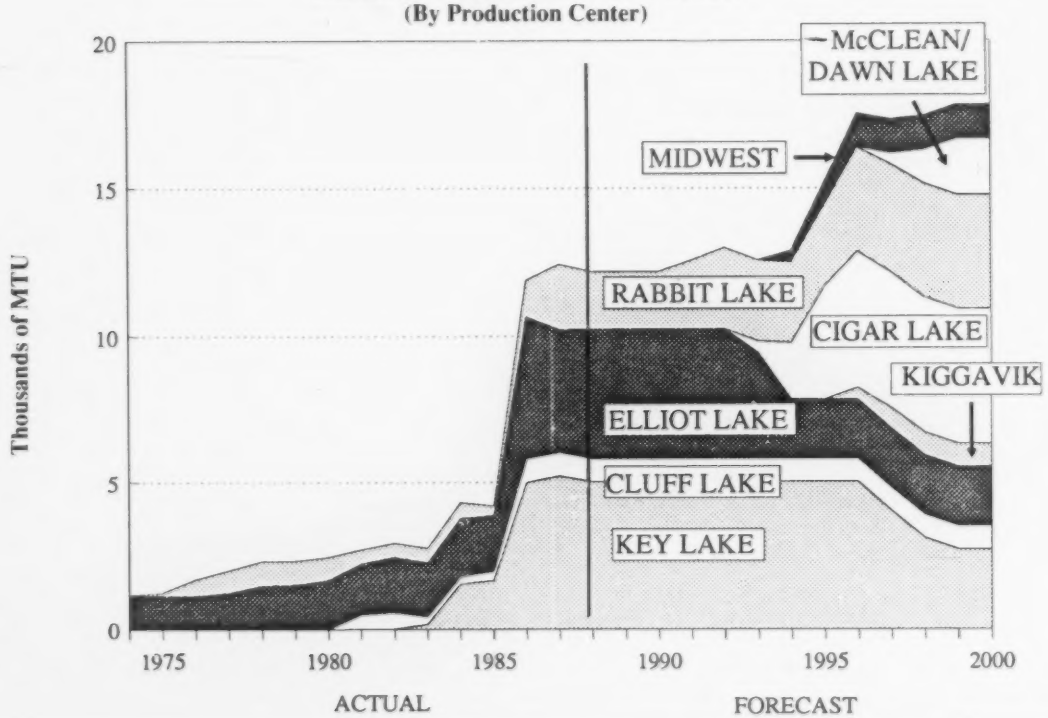
Figure 7 shows Canadian production since 1975, along with NUEXCO's projections for output in the 1990s, arranged by production center. Current output is dominated by the Key Lake project, which again exceeded rated mill capacity by producing 13.5 million pounds U_3O_8 (5100 MTU) in 1987. The Elliot Lake district of Ontario followed closely, although the district experienced a small decline in production due to a strike. The milling of high-grade ore from the Collins Bay "B" orebody increased output at the newly renovated Rabbit Lake mill to 5.7 million pounds (2200 MTU). Production at Cluff Lake remained slightly above two million pounds (770 MTU).

Looking once again at Figure 7, Nuexco expects the Key Lake project to continue anchoring Canadian production throughout the 1990s. The higher cost production centers of Eastern Canada could experience gradual declines, while newer projects in Saskatchewan and production at the Rabbit Lake complex should increase as the Eagle Point and Collins Bay deposits are fully exploited.

Aside from the success of those projects, a variety of new opportunities exist and could well come into production before the end of the century. Most promising from the standpoint of sheer size, and the discovery that has garnered the most attention in the industry, is the Cigar Lake deposit. Containing reserves of at least 385 million pounds or 148 thousand MTU at grades of five to fourteen percent U_3O_8, the Cigar Lake project could be underway as soon as 1993. The Saskatchewan Environment Department gave its approval for test mining in October 1987, and a two-year test mining program has been initiated to determine the technical feasibility of the project. The sinking of the exploratory test shaft began earlier this year.

Other promising deposits include Midwest Lake, which is currently undergoing feasibility studies, Dawn Lake, McClean Lake, and Kiggavik (Lone Gull) in the Northwest Territories. Undoubtedly, the success of the

Figure 7
CANADIAN URANIUM PRODUCTION
(By Production Center)



© NUEXCO 1988

current operating projects, combined with the favorable outlook for pending projects, will ensure and continue Canada's position as the world's largest uranium producer.

One major uncertainty on the horizon, however, involves the merger of the two largest participants, Eldorado and SMDC, into the government-owned Cameco. The competitive history of the two companies has had a significant effect on uranium prices in the past, and observers expect that what would have been separate and competing development plans for deposits such as Cigar Lake, Eagle Point, and Dawn Lake may now be centralized under a single plan. This rationalization of the mining plan, if it emerges, should have a positive effect on the market over the longer term, and probably makes economic sense in a worldwide market characterized by oversupply and weak prices. Until all of the details are clarified, however, it will be difficult to predict the extent to which the reduced competition will bolster the uranium market.

Political Developments

With Canada as the clear world leader in low-cost uranium production, the US production sector unable to fulfill US demand, and extremely close trade ties between the USA and Canada, normal commercial conditions would dictate that Canada would play perhaps the most significant role in US uranium supply during the 1990s. Indeed, that has been the case since the late 1970s, when free trade in uranium began to return to the US marketplace. Instead, we may now be returning to an era when political intervention overrides economic reality. As of mid-September, several serious complications to a free market were under debate in various political and judicial arenas. The outcome of these uncertainties will have a major impact on the uranium market and uranium trade between Canada and the USA.

In evaluating the various scenarios for artificial influence on the uranium market, one is struck by the complexity and seemingly endless possibilities for resolution. Without delving into every legal and administrative option available to the politicians, jurists, and government and industry negotiators, the following summarizes the major issues threatening free trade in uranium:

• **The US Producers' Lawsuit** has traveled through the US judicial system for the last four years. Based on an outdated provision in the US Atomic Energy Act, the suit alleged that the Department of Energy, the administrative body that provides uranium enrichment services to the worldwide market, is required to restrict the enrichment of non-US uranium for US utilities when the US uranium industry is no longer viable. Bolstered by DOE's own findings that the US production sector has been "non-viable" in the last three years, the Producers have prevailed in lower courts, beginning with the District Court decision in June 1986. That decision, under various appeals since then, required DOE to halt the enrichment of non-US uranium for US utilities until viability was restored. While under appeal, DOE has not been required to implement enrichment restrictions.

The appeal reached the US Supreme Court early in 1988, and a decision was announced on June 15. The Supreme Court reversed the lower courts' decisions in favor of the miners, and remanded (or sent back) the case to the lower court for further fact-finding. While it appeared to be a victory for DOE, the reversal and remand was essentially just another delay in the case while it is determined whether or not enrichment restrictions will help the US industry. The lower court has scheduled some hearings on the matter, but this fact-finding could last another year or longer. Eventually, a victory by DOE would continue the free-market conditions currently in effect. However, a victory by the US Producers could result in enrichment restrictions against foreign uranium for US utility use. The most obvious consequences of restrictions would be a significant premium for US-origin uranium as US utilities compete for available supplies, and weakness or stagnation in the world market as non-US producers compete for only two-thirds of their previous market. (This had been the case, although on a less severe scale, over most of 1987 simply because the market *expected* the US producers would win the case). Once again, because of the nature of the US court and appeal system, any resolution is likely to take considerable time.

• **Legislative Protection** for the US producers has been a recurring theme as several influential members of the US Congress have sought some form of taxpayer support for the ailing uranium industry. Until recently, these attempts have not been taken seriously by Congress, largely

© NUEXCO 1988

because a handful of uranium miners does not constitute a strong lobby in the US, and because of the Reagan Administration's general anti-protectionist stance. The latest bill involves a three-tiered approach to the various dilemmas of the US nuclear industry—relief for the miners via a government-subsidized uranium purchase program, allocation of funds for mill tailings cleanup, and the establishment of a private enrichment corporation to take over the enrichment operation from DOE. This attempt to solve all of the ills of the US nuclear industry has invariably garnered both wide support and wide opposition, but it appears to be making progress in the legislative arena. In early August, the US Senate passed a bill reorganizing the Nuclear Regulatory Commission with the aforementioned amendment attached, surprising much of the industry. The House vote is expected shortly, but the bill is likely to encounter much more opposition in the House, particularly due to the expensive subsidy that the government buying program would represent for the US uranium producers. The upcoming elections may further delay action on the bill and amendment.

As far as market implications go, it seems too early to tell what impact a buying program would have. At first glance, if the measure does succeed, it might appear to place upward pressure on world prices merely because of the added demand. However, there will certainly be a number of complicated rules governing the purchases, and the government demand is strictly artificial, implying that eventually the material will again be on the market. More importantly, with the exception of the US government, no utilities would be required to purchase or enrich a certain amount of US-origin uranium, so any new US-origin demand would be limited to the government program. Without being required to do so, few if any utilities can be expected to pay a significant premium for US-origin uranium, which thereby could actually reduce utility demand for US uranium, and increase the demand for lower-priced Canadian material. Under such circumstances, an artificial US market could exist with the government as the sole buyer at high prices, but in the real market the US producers would still have to compete with the other producers worldwide.

• **The US-Canada Free Trade Agreement** entered the picture last October, when Canadian and US trade negotiators agreed on a package of measures designed to remove existing tariffs and encourage free trade between the two countries. While avoiding the debate over the relative merits of the Agreement, it is apparent that the Agreement would foster true free trade in uranium. In exchange for the Canadian forfeiture of the upgrading requirement, the US agreed not to restrict the enrichment of Canadian uranium under Section 161(v) of the Atomic Energy Act, the focus of the Producers' Lawsuit.

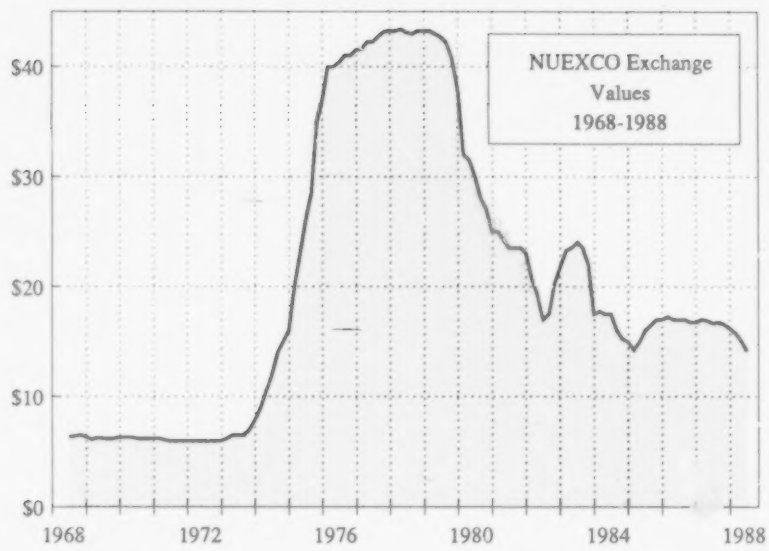
There has been a great deal of debate over the FTA since it was signed by Prime Minister Mulroney and President Reagan in January, as both governments mobilize support for the Congressional and Parliamentary ratification necessary to implement it. If it is enacted, Nuexco expects free-market conditions to prevail, and Canadian producers would retain or improve on existing market share in the USA. Although the US Congress has ratified the implementing legislation, its passage in Canada appears less certain. Demanding that a national election be called before it would consider the FTA, the opposition Liberal Party has stalled the FTA legislation in the Canadian Senate. On October 1, 1988, in response to increasing pressure, Canadian Prime Minister Mulroney scheduled a general election for November 21. If the Conservatives win the election, there may be a chance that the FTA will be ratified in time for the January 1, 1989 effective date. A coalition or Liberal victory, or any other delays in the process, are certain to jeopardize the FTA's passage and implementation for 1989 and possibly beyond.

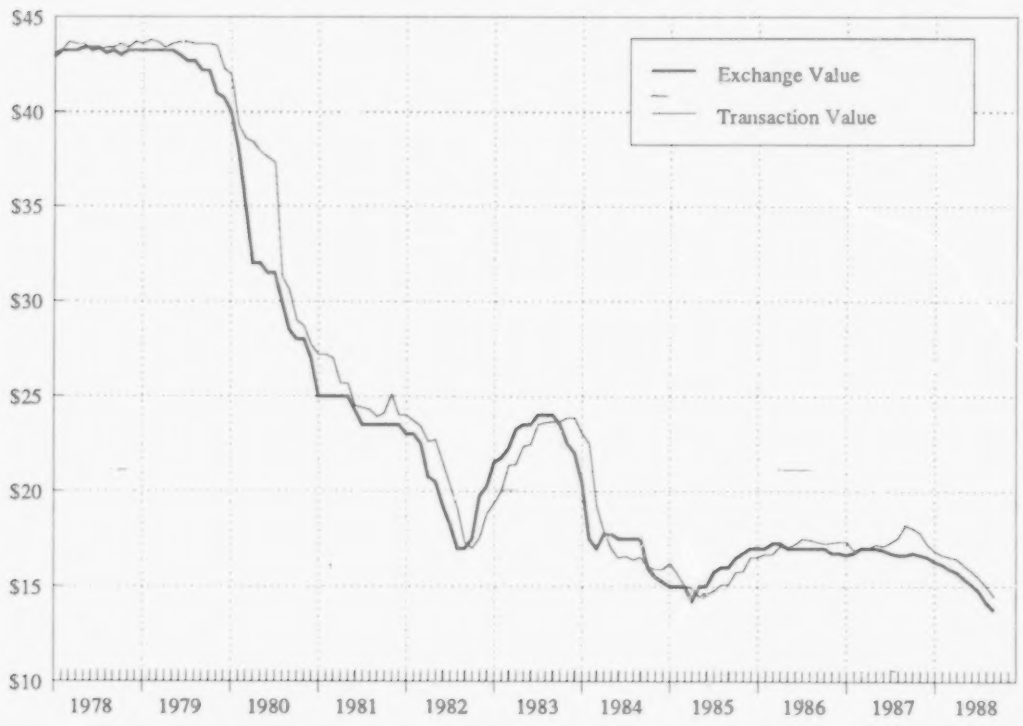
In closing, as the commercial uranium market enters its third decade, prices for Canadian uranium will be highly dependent on these interrelated factors. Most of these uncertainties appear to be drawing near some sort of resolution. In addition, the marketing and production decisions of the Cameco organization will undoubtedly have a significant impact on future price direction over the longer term. In the meantime, generally optimistic demand projections worldwide should provide some encouragement to producers in this oversupplied market. Canada's strength as a uranium producing nation has been based upon its low-cost structure, vast reserves, and its commercial history with the USA, the world's largest market. However, if history is any indication, real economic factors may be the least influential pressure on future uranium prices. ■

© NUEXCO 1988

NUEXCO Historical Exchange and Transaction Values

(In US Dollars/Pound U_3O_8)





© NUEXCO 1988

NUEXCO

HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES
Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	15.75	15.40	15.10	14.75	14.15	**13.75**			

HISTORICAL US PREMIUM (Relative to the Exchange Value)
Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	0.25	0.60	0.00	0.00	0.00	**0.00**			

HISTORICAL TRANSACTION VALUES
Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.30	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.05	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	16.45	16.10	15.80	15.45	15.00	**14.50**			

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated ($US/lb. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.80	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	1.80	1.80	1.80	1.85	1.95	**1.95**			

HISTORICAL UF_6 VALUES

Determined as of the last day of the month indicated ($US/kg. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	45.25	44.75	44.00	42.75	41.00	**40.75**			

HISTORICAL US UF_6 PREMIUM (Relative to the UF_6 Value)

Determined as of the last day of the month indicated ($US/kg U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	0.50	1.00	0.00	0.00	0.00	**0.00**			

HISTORICAL SWU VALUES (at 0.30 Percent Tails Assay)

Determined as of the last day of the month indicated ($US per SWU)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	80	80	80	80	75	78	78	78	78	78	80	80
1987	80	80	77	77	75	73	75	75	73	69	73	73
1988	73	73	70	68	68	68	68	65	**65**			

© NUEXCO 1988

NUEXCO

HISTORICAL MARKET DATA

VOLUME AND PRICE OF URANIUM DELIVERIES TO THE EUROPEAN COMMUNITY[1]
(Compiled from data published by the Euratom Supply Agency)

Year	Volume of Deliveries to the EC[2] (in MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts[3,4]		Spot Contracts[3,4]	
			Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8	Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75
1987	14,000	17.0	ECU 28.25	$32.50	ECU 15.00	$17.25

[1]The twelve European Community member nations are Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.
[2]The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.
[3]For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar.
[4]Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

©NUEXCO 1988

US URANIUM MARKETING ACTIVITIES STATISTICS[1]
(Compiled from data published by the US Energy Information Administration)

Year	Total Production[2] (million pounds U_3O_8)	Deliveries to Domestic Utilities[3] (million pounds U_3O_8)	Average Price of Delivered Uranium ($/lb. U_3O_8)	Quantity of Uranium Imported[4] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	n/a	n/a	3.6	n/a	1.2
1977	29.9	n/a	n/a	5.6	n/a	4.0
1978	37.0	n/a	n/a	5.2	n/a	6.8
1979	37.5	33.0[5]	$23.85[5]	3.0	n/a	6.2
1980	43.7	35.0[5]	$28.15[5]	3.6	$43.10	5.8
1981	38.5	32.6[5]	$34.65[5]	6.6	$32.90	4.4
1982	26.9	27.1	$38.37	17.1	$27.23[6]	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6
1987	13.1P		$27.45P	14.0P	$19.31P	

P = Preliminary

[1]Sources: 1979: US Department of Energy, Assistant Secretary for Resource Applications, Office of Uranium Resources and Enrichment, *Survey of United States Uranium Marketing Activity*, DOE/RA-0053 (Washington DC, July 1980). 1980-1981: US Department of Energy, Assistant Secretary for Nuclear Energy, Office of Uranium Enrichment and Assessment, *Survey of United States Marketing Activity*, DOE/NE-0013 and DOE/NE-0013/1 (Washington DC, June 1981 and July 1982). 1982: Energy Information Administration, *1982 Survey of United States Marketing Activity*, DOE/EIA-0403 (Washington DC, September 1983). 1983: Energy Information Administration, *Survey of United States Marketing Activity 1983*, DOE/EIA-0403(83) (Washington DC, August 1984). 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985). 1986: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1986). 1987: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey"(1987).

[2]Sources: 1976-1982: US Department of Energy, Grand Junction Area Office, *Statistical Data of the Uranium Industry*, GJO-100 (Grand Junction, Colorado, January 1983). 1983: Calculated by the staff of the Nuclear and Alternate Fuels Division, Office of Coal, Nuclear, Electric and Alternate Fuels, Energy Information Administration, from US Department of Energy, Grand Junction Area Office data files. 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[3]Excludes direct imports by domestic utilities.

[4]Includes imports by domestic utilities and domestic suppliers.

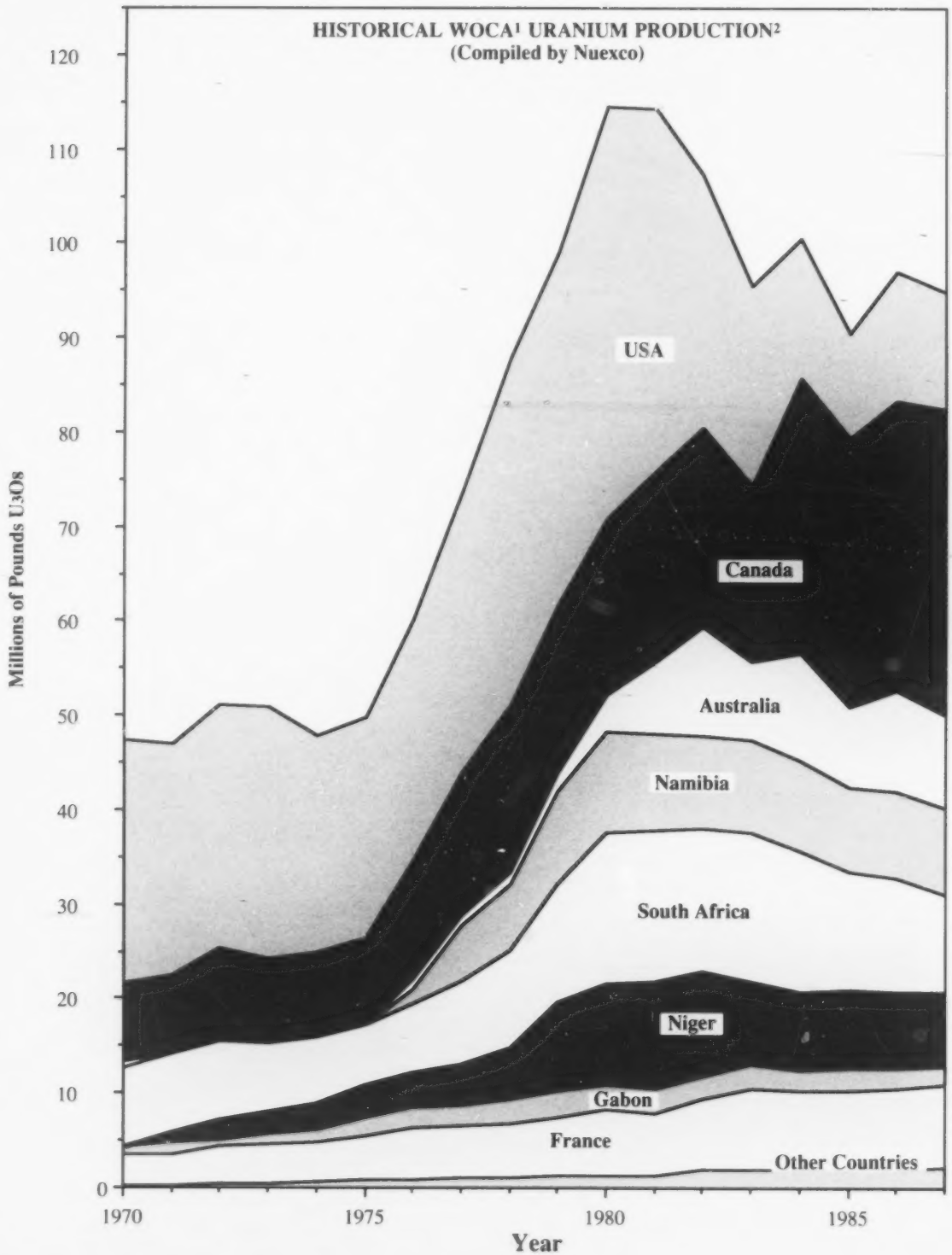
[5]Includes delivery commitments to domestic utilities and agents.

[6]Computation of quantity-weighted average price excludes the quantity associated with a large exchange (swap) transaction that occurred in 1982.

© NUEXCO 1988

NUEXCO

HISTORICAL MARKET DATA



[1] WOCA = World Outside of Centrally-Planned Economic Areas.
[2] 1987 production data are preliminary.

AUSTRALIA

		Consumer Price Index[1] (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups[2] (1984/1985 = 100)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates[3] (June 1976=100)
1975	Avg.[4]	57.9	36.3	82.1
1976	Avg.	65.7	40.7	99.7
1977	Avg.	73.8	46.3	110.8
1978	Avg.	79.7	52.0	117.7
1979	Avg.	86.9	69.5	127.9
1980	Avg.	95.8	83.1	140.8
1981	Avg.	105.0	85.9	154.1
1982	Avg.	116.7	89.0	174.9
1983	Avg.	128.5	96.9	181.9
1984	Avg.	133.6	98.0	194.4
1985	Avg.	142.6	107.3	198.7 (Jan - May) 101.1 (Jun - Dec)[5]
1986	Avg.	155.5	101.5	104.9
1987	Avg.	168.7	108.9	—
Jan	1987	—	106.2	108.8
Feb	1987	—	108.9	108.8
Mar	1987	164.7	108.4	111.7
Apr	1987	—	108.3	111.7
May	1987	—	108.1	111.7
June	1987	167.2	108.1	111.8
July	1987	—	108.7	111.9
Aug	1987	—	110.5	111.9
Sep	1987	170.0	109.3	112.1
Oct	1987	—	108.6	112.2
Nov	1987	—	110.0	112.2
Dec	1987	172.9	111.9	112.3
Jan	1988	—	112.4	112.4
Feb	1988	—	112.3	114.2
Mar	1988	176.0	112.3	114.3
Apr	1988	—	112.4	114.3
May	1988	—	114.1	—
Jun	1988	—	114.0	—

P = Preliminary **R** = Revised since last month

[1]Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 =100.0). Figures shown at end of quarter represent quarterly average.
[2]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).
[3]Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.
[4]Monthly data for the period 1967 to 1986 appear in Report 233.
[5]Base: June 1985 = 100 and includes salary earners as well as wage earners.

© NUEXCO 1988

NUEXCO

GOVERNMENT STATISTICS

CANADA

		Industrial Products Price Index: All Commodities[1] (1981 = 100)	Consumer Price Index: All Items (1981 = 100)	Wage-earner Data: Average Hourly Earnings (C$)[2]				
				Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)
1979	Avg.	80.0	80.7	—	—	—	—	—
1980	Avg.	90.7	88.9	—	—	—	—	—
1981	Avg.	100.0	100.0	—	—	—	—	—
1982	Avg.	106.7	110.8	—	—	—	—	—
1983	Avg.	110.4	117.2	17.22	—	14.18	10.67	11.10
1984	Avg.	115.4	122.3	17.89	—	14.97	11.11	11.68
1985	Avg.	118.6	127.2	18.53	16.48	15.56	11.85	12.12
1986	Avg.	119.6	132.4	19.38	16.70	15.76	12.28	12.58
Jan	1987	120.0	135.2	19.53	16.93	16.03	12.58	12.89
Feb	1987	119.8	135.8	20.33	17.20	16.21	12.66	13.11
Mar	1986	120.4	136.4	20.04	17.14	16.15	12.58	13.02
Apr	1987	121.2	137.0	20.47	17.38	16.26	11.99	13.27
May	1987	122.0	137.8	20.50	17.12	15.96	11.44	13.19
June	1987	122.5	138.2	20.23	16.94	15.70	12.77	12.88
July	1987	123.2	139.2	19.75	16.73	15.63	12.52	12.98
Aug	1987	123.8	139.3	19.64	16.98	15.87	12.65	13.03
Sep	1987	124.1	139.3	19.85	17.20	16.25	12.57	13.40
Oct	1987	124.5	139.8	20.06	17.31	16.33	13.01	13.37
Nov	1987	125.1	140.4	20.47	17.50	16.50	12.63	13.53
Dec	1987	125.5	140.5	20.62	17.31	16.37	12.54	13.75
Jan	1988	126.4	140.8	20.70	17.54	16.65	12.82	13.73
Feb	1988	125.9	141.3	20.94	17.97	17.07	13.01	13.69
Mar	1988	126.2	142.0	20.55	17.88	16.78	13.10	13.62
Apr	1988	126.8	142.5	20.03	18.50	15.92	13.32	13.66
May	1988	127.2	143.4	20.92	18.21R	17.03	13.02	13.58
Jun	1988	127.1	143.6	21.04	18.31R	16.95R	13.03R	13.76R
Jul	1988	128.0	144.5	20.86P	18.30P	16.88P	12.95P	13.64P
Aug	1988	128.1	144.9	—	—	—	—	—

P = Preliminary **R** = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1986 is found in Report 233.
[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1986 is found in Report 233.
[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."

© NUEXCO 1988

REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1985 = 100)	Production Price Index All Groups[4] (1980 = 100)	Total Employment in Mining and Quarrying[5]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand)[5]
1975	Avg.	16.71	—	29.4	52.1	639,473	1,003,217
1976	Avg.	19.30	—	32.7	59.9	671,240	1,212,983
1977	Avg.	23.87	—	36.3	67.7	712,006	1,420,670
1978	Avg.	27.14	—	40.3	74.3	658,261	1,502,975
1979	Avg.	30.18	—	45.6	85.6	686,599	1,795,638
1980	Avg.	35.53	—	51.9	100.0	709,042	2,237,689
1981	Avg.	41.89	—	59.8	113.6	722,918	2,756,928
1982	Avg.	47.25	104.2	68.6	129.4	702,041	3,181,584
1983	Avg.	51.88	115.0	77.1	143.1	700,901	3,563,282
1984	Avg.	58.95	130.3	86.0	155.1	711,511	4,134,390
1985	Avg.	68.76	151.6	100.0	181.2	724,587	4,778,612
1986	Avg.	80.22	177.9	118.6	216.6	756,637	5,767,950
1987	Avg.	—	—	137.7	246.8	750,256	—
Jan	1987	—	—	128.9	233.9	750,496	529,682
Feb	1987	—	—	130.3	237.0	758,230	600,258
Mar	1987	88.17	197.1	132.4	239.6	763,003	536,033
Apr	1987	—	—	134.1	242.5	765,309	535,876
May	1987	—	—	135.6	243.6	761,026	531,732
Jun	1987	90.74	203.5	136.6	244.9	763,319	571,407
July	1987	—	—	138.2	246.8	764,810	624,954
Aug	1987	—	—	140.2	249.9	761,338	564,387
Sep	1987	100.79	224.7	142.0	252.4	742,417	587,707
Oct	1987	—	—	143.6	255.5	725,599	599,116
Nov	1987	—	—	144.8	256.3	734,630	616,725
Dec	1987	100.34	267.0	145.9	258.3	712,896	613,262
Jan	1988	—	—	147.2	261.5	711,983	615,889
Feb	1988	—	—	148.2	265.7	730,313	621,757R
Mar	1988	102.90R	234.0	150.2	268.4	—	619,117
Apr	1988	—	—	151.9	272.7	—	621,757
May	1988	—	—	153.1	276.1	—	—
Jun	1988	103.59	234.0	153.6	278.2	—	—
Jul	1988	—	—	155.3	—	—	—

P = Preliminary **R** = Revised since last month

[1]Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in Report 236.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Central Statistical Service, Pretoria: All income groups-weighted average, Historical Data by month appears in Report 236.

[4]Central Statistical Service, Pretoria: All commodities for consumption in South Africa.

[5]Central Statistical Service, Pretoria: Historical Data by month appears in Report 236.

©NUEXCO 1988

NUEXCO

GOVERNMENT STATISTICS

UNITED STATES

		Producer Price Index[1]		Consumer Price	GNP Implicit Price	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)	Index[2] (1982-1984 = 100)	Deflator[3] (1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	88.0	89.8	82.4	85.7	10.26	10.63	8.30	6.94
1981	Avg.	97.4	98.0	90.9	94.0	11.55	11.98	9.12	7.62
1982	Avg.	100.0	100.0	96.5	100.0	12.31	12.93	9.96	8.21
1983	Avg.	101.1	101.3	99.6	103.9	12.58	13.43	10.58	8.67
1984	Avg.	103.3	103.7	103.9	107.7	13.05	13.43	11.07	9.04
1985	Avg.	103.7	103.2	107.6	111.2	13.38	13.74	11.56	9.46
1986	Avg.	100.0	100.2	109.6	114.1	12.46	13.48	11.98	9.65
1987	Avg.	102.6	102.8	113.6	—	12.52	12.98	12.37	9.88
Jan	1987	100.4	100.5	111.2	—	12.72	12.96	12.17	9.82
Feb	1987	100.8	101.0	111.6	—	12.63	12.80	12.21	9.82
Mar	1987	101.1	101.2	112.1	116.1	12.58	12.76	12.24	9.82
Apr	1987	101.6	101.9	112.7	—	12.51	12.84	12.30	9.81
May	1987	101.9	102.6	113.1	—	12.50	12.87	12.32	9.81
Jun	1987	102.4	103.0	113.5	117.2	12.52	12.88	12.28	9.83
Jul	1987	103.1	103.5	113.8	—	12.41	13.02	12.37	9.86
Aug	1987	103.7	103.8	114.4	—	12.40	13.01	12.33	9.98
Sep	1987	103.5	103.7	115.0	117.8	12.50	13.29	12.56	9.94
Oct	1987	104.0	104.1	115.3	—	12.42	12.99	12.50	9.92
Nov	1987	104.2	104.2	115.4	—	12.54	13.11	12.55	9.98
Dec	1987	104.1	104.1	115.4	118.7	12.60	13.14	12.61	10.03
Jan	1988	104.3	104.5	115.7	—	12.77	13.03	12.55	10.02
Feb	1988	104.6	104.8	116.0	—	12.71	12.96	12.55	10.02
Mar	1988	104.7	104.9	116.5	119.4	12.59	13.17	12.53	10.04
Apr	1988	105.6	105.8	117.1	—	13.08	13.17	12.57	10.09
May	1988	106.1	106.5	117.5	—	12.99R	13.09	12.59	10.12
Jun	1988	106.5	107.4	118.0	120.6	13.17R	13.12	12.60	10.15
Jul	1988	106.7	107.8	118.5	—	13.18P	13.26P	12.70R	10.12R
Aug	1988	107.1	108.0	119.0	—	—	—	12.64P	10.12P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in Report 233.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 233.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 233.

[4]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 233.

© NUEXCO 1988

NUEXCO

SERVICE LOCATIONS

DENVER, COLORADO, USA
Three Park Central
1515 Arapahoe Street
Suite 900
Denver, Colorado 80202
Telephone: (303) 899-4500
Telecopy: (303) 899-4555
Telex: 450202 (NUEXCO DVR)

SAN FRANCISCO, CALIFORNIA, USA
Building 1, Suite 105
3000 Sand Hill Road
Menlo Park, California 94025
Telephone: (415) 854-1510
Telecopy: (415) 854-2115
Telex: 470674 (NUEXCO)

TOKYO, JAPAN
Ohkura Building
1-4-10 Shiba Daimon
Minato-ku, Tokyo, Japan
Telephone: (81-3) 431-6025
Telecopy: (81-3) 434-6674
Telex: 242-5060 (JATECH J)

GENEVA, SWITZERLAND
13 chemin du Levant
01210 Ferney-Voltaire
France
Telephone: (33-50) 428035
Telecopy: (33-50) 428526
Telex: 385288 (NUEXCO F)

ZURICH, SWITZERLAND
135 Zurichstrasse
CH-8700 Küsnacht
Switzerland
Telephone: (41-01) 910-8977
Telecopy: (41-01) 910-6672
Telex: 58877 (NUXCH)

HONG KONG
1403 Shui On Centre
6-8 Harbour Road, Wanchai
Hong Kong
Telephone: (852-5) 865-1418
Telecopy: (852-5) 865-2721
Telex: 67206 (CNITC)

WASHINGTON, D.C., USA
2603 Valley Drive
Alexandria, Virginia 22302
Telephone: (703) 549-0880
Telecopy: (703) 549-0882

19636 Club House Road, Suite 110
Montgomery Village, Maryland 20879
Telephone: (301) 670-8660
Telecopy: (301) 670-8668
Telex: 248253 (SWUCO UR)

REPRESENTATIVES

AUSTRALIA **James G. Munro**
7 Nevada Street
North Balwyn, Victoria 3104
Australia
Telephone: (61-3) 857-6823
Telecopy: (61-3) 857-8258

SOUTH AFRICA **Chris I. von Christierson**
Southern Prospecting (Pty) Limited

Mailing Address
Post Office Box 61409
Marshalltown 2107
Republic of South Africa

Telephone: (27-11) 838-1868
(27-11) 834-4211

Street Address
7th Floor,
Marshall Place
66 Marshall Street
Johannesburg 2001
Telecopy: (27-11) 834-3148
Telex: 4-89878-SA

UNITED STATES **Harold C. Lindberg**
83-A Hardee Lane
Whispering Pines, North Carolina 28327
Telephone: (919) 949-3622
Telecopy: (919) 949-2626

JAPAN **Kazuo Yokota**
Japan Tech Services
Ohkura Building (3F)
1-4-10 Shiba Daimon
Minato-ku, Tokyo, Japan
Telephone: (81-3) 431-6031, 6025
Telecopy: (81-3) 434-6674
Telex: 242-5060 (JATECH J)

TAIWAN **Edward Bee**
Bee & Liang Company, Ltd.
14 FL Universal Business Center
NO. 663, Tun Hwa South Road
Post Office Box 1396
Taipei, Taiwan R.O.C.
Telephone: (886-2) 704-9630
Telecopy: (886-2) 703-4625
TWX 785-11570 (BEELIANG)

UNITED STATES **Ralph O. Smith**
141 Braemar Drive
Cheshire, Connecticut 06410
Telephone: (203) 272-6246
Telecopy: (203) 271-1346

© NUEXCO 1988

INTERNATIONAL HEADQUARTERS

Three Park Central, Suite 900
1515 Arapahoe Street
Denver, Colorado 80202

Telephone: (303) 893-4015
Telecopy: (303) 825-4821
Telex: 450202/NUEXCO DVR